

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference ILF 2501 PCT	<div style="display: flex; justify-content: space-between;"> <div style="width: 40%;"> FOR FURTHER ACTION </div> <div style="width: 60%; font-size: small;"> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below. </div> </div>	
International application No. PCT/GB 96/ 02996	International filing date(<i>day/month/year</i>) 05/12/1996	(Earliest) Priority Date (<i>day/month/year</i>) 23/12/1995
Applicant THE GLACIER METAL COMPANY LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.
☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (see Box I).

2. ☐ Unity of invention is lacking (see Box II).

3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.
☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ Transcribed by this Authority

4. With regard to the title,

☒ the text is approved as submitted by the applicant.
☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is:
 Figure No. 1

☒ as suggested by the applicant. ☐ None of the figures.
☐ because the applicant failed to suggest a figure.
☐ because this figure better characterizes the invention.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 96/02996A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B04B5/00 B04B9/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 193 000 A (AE PLC) 3 September 1986 cited in the application see figures 4-6 ---	1
A	GB 723 339 A (THE GLACIER METAL COMPANY) 9 February 1955 ---	
A	US 1 362 619 A (S.H. HALL) 21 December 1920 -----	

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

8 April 1997

Date of mailing of the international search report

10.1.04.97

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+ 31-70) 340-3016

Authorized officer

Leitner, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 96/02996

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 193000 A	03-09-86	AU 585314 B	15-06-89
		AU 5382186 A	04-09-86
		BR 8600736 A	04-11-86
		CA 1294593 A	21-01-92
		ES 2091162 A	16-10-96
		FR 2577824 A	29-08-86
		JP 6049162 B	29-06-94
		JP 61234963 A	20-10-86
		US 4787975 A	29-11-88

GB 723339 A		NONE	

US 1362619 A	21-12-20	NONE	

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 30 SEP. 1997

WIPO PCT

Applicant's or agent's file reference ILF 2501	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB 96/ 02996	International filing date (day/month/year) 05/12/1996	Priority date (day/month/year) 23/12/1995
International Patent Classification (IPC) or national classification and IPC B04B5/00		
Applicant THE GLACIER METAL COMPANY LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This **REPORT** consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consists of a total of _____ sheets.

3. This report contains indications and corresponding pages relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 10/07/1997	Date of completion of this report 26. 09. 97
Name and mailing address of the IPEA/  European Patent Office D-80298 Munich Tel. (+ 49-89) 2399-0, Tx: 523656 epmu d Fax: (+ 49-89) 2399-4465	Authorized officer  S. Kock Telephone No.

I. Basis of the report

1. This report has been drawn up on the basis of (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.):

☒ the international application as originally filed.

☐ the description, pages _____, as originally filed,
pages _____, filed with the demand,
pages _____, filed with the letter of _____,
pages _____, filed with the letter of _____,

☐ the claims, Nos. _____, as originally filed,
Nos. _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. _____, filed with the letter of _____,
Nos. _____, filed with the letter of _____,

☐ the drawings, sheets/fig. _____, as originally filed,
sheets/fig. _____, filed with the demand,
sheets/fig. _____, filed with the letter of _____,
sheets/fig. _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____.
☐ the claims, Nos. _____.
☐ the drawings, sheets/fig. _____.

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

Intern. application No.

PCT/GB96/02996

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims 1-3 _____	YES
	Claims _____	NO
Inventive Step (IS)	Claims 1-3 _____	YES
	Claims _____	NO
Industrial Applicability (IA)	Claims 1-3 _____	YES
	Claims _____	NO

2. CITATIONS AND EXPLANATIONS

- 1). The present international application relates to a centrifugal separator of the self-powered kind.

From EP-A-0 193 000 (acknowledged in the description) a centrifugal separator is known which represents the most pertinent prior art.

- 2). The subject-matter of independent claim 1 differs from the disclosure of EP-A-0 193 000 by the features of the characterising portion. Consequently, the subject-matter of claim 1 is novel (Article 33.2 PCT).

- 3). These differentiating features (i.e. the provision of a thrust bearing constituted by a taper on the axle means and a bush conforming to the taper) solve the problem addressed (minimizing noise and vibrations during wind-down of the separator).

None of the available prior art documents disclose a thrust bearing having the claimed characteristics, i.e.

an axle means tapering from a lower region of greatest diameter to an upper region of lesser diameter.

Consequently, since the differentiating features are neither known from nor rendered obvious by the prior art, it would not be obvious for the man skilled in the art to combine the features set out in independent claim 1.

Consequently, the subject-matter of claim 1 involves an inventive step (Article 33.3 PCT).

- 3). Dependent claims 2 and 3 disclose further embodiments of the separator of claim 1 and do likewise meet the requirements of Article 33 PCT with regard to novelty and inventive step.
- 4). The subject-matter of the present application is considered to be industrially applicable (Article 33.4 PCT).

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

- 1). The document GB 2383194 cited in the opening part of the description appears not to exist. The number should have been corrected.

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

United States Patent and Trademark
Office
(Box PCT)
Crystal Plaza 2
Washington, DC 20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 30 July*1997 (30.07.97)	
International application No. PCT/GB96/02996	Applicant's or agent's file reference ILF 2501 PCT
International filing date (day/month/year) 05 December 1996 (05.12.96)	Priority date (day/month/year) 23 December 1995 (23.12.95)
Applicant PURVEY, Ronald, James	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

15 July 1997 (15.07.97)

☐ in a notice effecting later election filed with the International Bureau on:
2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Céline Faust Telephone No.: (41-22) 338.83.38
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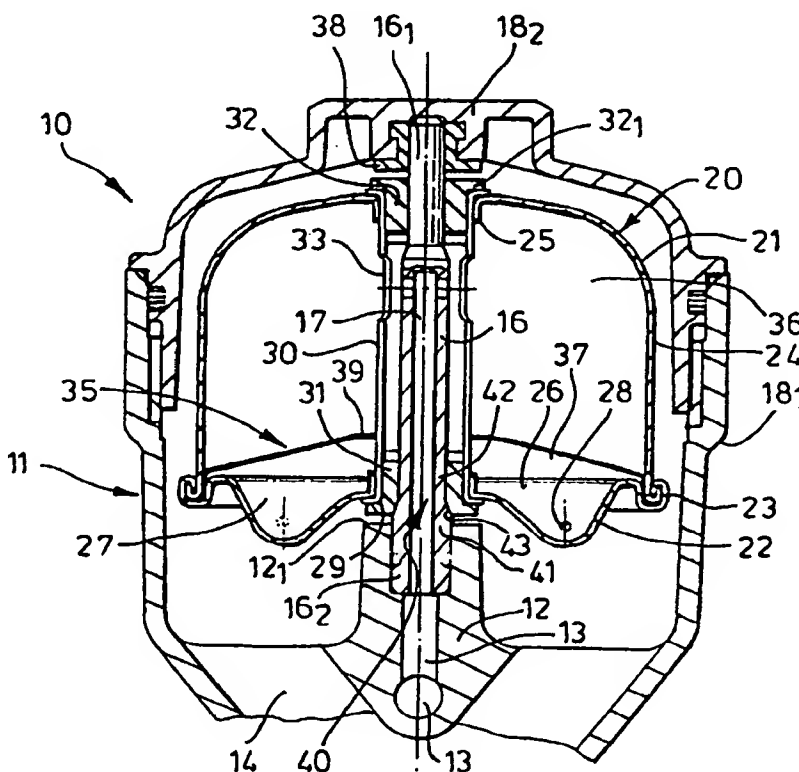
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : B04B 5/00, 9/12	A1	(11) International Publication Number: WO 97/23296 (43) International Publication Date: 3 July 1997 (03.07.97)
<p>(21) International Application Number: PCT/GB96/02996</p> <p>(22) International Filing Date: 5 December 1996 (05.12.96)</p> <p>(30) Priority Data: <u>9526523.7</u> <u>23 December 1995 (23.12.95)</u> GB</p> <p>(71) Applicant (for all designated States except US): THE GLACIER METAL COMPANY LIMITED [GB/GB]; Argyle House, Joel Street, Northwood Hills, Middlesex HA5 1LN (GB).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): PURVEY, Ronald, James [GB/GB]; 1 Fossey Close, Axminster, Devon EX13 5LW (GB).</p> <p>(74) Agents: HAMMERSLEY, John et al.; T & N plc, Bowdon House, Ashburton Road West, Trafford Park, Manchester M17 1RA (GB).</p>		<p>(81) Designated States: AU, BR, JP, MX, US, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published <i>With international search report.</i></p>

(54) Title: CENTRIFUGAL SEPARATOR

(57) Abstract

A self-powered centrifugal separator (10), for separating particulate contaminants from a liquid lubricant of an automobile engine, includes a rotor container (24) rotatable about an axle (16) to which it is journaled by bushes (31 and 32). When the engine is running, a film of pressurised liquid between the bushes and axle lubricates them and provides radial stiffness, but when the engine stops and liquid supply ceases, radial stiffness is reduced and the partially emptying container may vibrate and create wind-down noise. At least one bush (31), which normally provides a horizontal thrust bearing to support the weight of the container at low speed, has, with the axle portion (43) it surrounds, a region tapering in diameter to centre the container with respect to the axle and provide both radial and axial support.



INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 96/02996

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B04B5/00 B04B9/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 B04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 1 362 619 A (S.H. HALL) 21 December 1920 -----	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- * "A" document defining the general state of the art which is not considered to be of particular relevance
- * "E" earlier document but published on or after the international filing date
- * "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- * "O" document referring to an oral disclosure, use, exhibition or other means
- * "P" document published prior to the international filing date but later than the priority date claimed

- * "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- * "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- * "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- * "&" document member of the same patent family

Date of the actual completion of the international search

8 April 1997

Date of mailing of the international search report

11.04.97

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Fax (+31-70) 340-3016

Authorized officer

Leitner, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

I. International Application No

PCT/GB 96/02996

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 193000 A	03-09-86	AU 585314 B	15-06-89
		AU 5382186 A	04-09-86
		BR 8600736 A	04-11-86
		CA 1294593 A	21-01-92
		ES 2091162 A	16-10-96
		FR 2577824 A	29-08-86
		JP 6049162 B	29-06-94
		JP 61234963 A	20-10-86
		US 4787975 A	29-11-88

GB 723339 A		NONE	

US 1362619 A	21-12-20	NONE	
